SCIENTIFIC SERIALS

Annalen der Physik und Chemie, No. 12.—On the volume-changes of water containing salts on heating, and the resulting chemical transpositions, by E. Wiedemann.—On the molecular refraction of sulpho-carbonic ether, with some remarks on molecular refraction in general, by the same.—On the dispersion of colourless transparent media, by A. Wüllner.—Some remarks on the papers of Herren Hasselberg and Goldstein, by the same.—On galvanic elements supposed to consist only of elements, and the electromotive useful effect of chemical processes, by F. Braun.—The electric conductivity of chloride, oromide, and iodide of silver, by W. Kohlrausch.—On methods of multiplication and rejection, by E. Dorn.—Contributions to a knowledge of the relations between fluidity and galvanic conductivity, by C. Stephan.—On the joint action of traction and torsion in metallic wires, by F. Himstedt.—On the connection between the units of magnetism and of electricity, by R. Clausius.—On the theory of Fresnel's integrals, by A. Lindstedt.—On the theory of elastic reaction, by E. J. Michælis.

Journal de Physique, November.—On the methods to employ for determining the ohm, by L. Lorenz.—On the electro-chemical figuration of equipotential systems, by A. Guébhard.—On the liquefaction of ozone, by P. Hautefeuille and J. Chappuis.—On the absorption spectra of ozone and pernitric acid, by J. Chappuis.—Application of instantaneous photography to the study of animal locomotion, by G. Demeny.

Journal of the Russian Chemical and Physical Society, vol. xiv. fascicule 7.—On the action of the cyanide of ammonium on glyoxal, by M. N. Lubavin.—On the decomposition of the acetate of tertiary amyl by heat, by Prof. Menshutkin.—Analysis of the water which accompanies naphtha in wells, and ejected by mud-volcanoes, by M. A. Potilitzin.—On new beds of mineral manure, by M. P. Grigorieff.—Analysis of naphtha coke, by M. A. Lidoff.—Residual elasticity and analogous physical phenomena, by M. N. Hesehus.—Review of Russian chemical literature for the year 1881, by M. N. Lubavin.

Archives des Sciences Physiques et Naturelles, October 15.—On cometary refraction, by G. Cellerier.—On the duration of excitability of nerves after the separation of their nutritive centres, by O. Gorlinsky.—Researches on lodes, by F. Sandberger.—The grain of the glacier, by E. Hagenbach-Bischoff.

November 15.—Sixty-fifth session of the Helvetic Society of Natural Sciences, held at Linthhal on September 11, 12, 13, 1882.—The prehistoric antiquity of man, by G. de Mortillet.—The origin of cultivated plants, by A. de Candolle.—New researches on the appearances of Jupiter, by E. W. Hough.

Journal of the Franklin Institute, November.—An improved feed-water heater and purifier, by G. E. Strong.—Economical steam power, by W. B. Le Van.—Note on the pendulum, by J. R. French.—Vision by the light of the electric spark, by W. Le Conte Stevens.—Notes on water analysis, by R. Haines.—Report on European sewerage systems, &c., by R. Hering.—Examination of water and air for sanitary purposes, with remarks on disinfection, by R. Hitchcock.—Report of Committee on the Rappleye rheometric governor burner.—The silver and gas dynanometers, by L. H. Sargent.—The American iron trade in 1881.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, November 8.—"Note on the Discovery of Bacilli in the Condensed Aqueous Vapour of the Breath of Persons affected with Phthisis." By Arthur Ransome. Communicated by Dr. W. Roberts, F.R.S.

In the year 1869 the author had examined the aqueous vapour of the breath in health and disease. This vapour was condensed in a glass globe surrounded by ice and salt, and, in condensing, it was found to carry down all the organic matter contained in the breath. It appeared probable that the breath of persons in advanced stages of phthisis would contain the bacillus of tubercle, and that this organism could be rendered visible by Dr. Heneage Gibbes' method of staining.

The aqueous vapour of the breath of several advanced cases of phthisis was accordingly condensed by the above-mentioned method, and each specimen was separately examined.

In order to carry down the organic matter, and to afford a basis to attach the material to the microscopic cover glasses, fresh white of egg, or a little mucus, free from bacilli, was added to the fluid.

No attempt was made to sterilise the fluids, as the ordinary bacteria of putrefaction are not stained by the process used.

In the aqueous vapour obtained from two of the cases, specimens of bacillus were found which took the staining in the same manner as the bacillus found in phthisical sputa and in tubercle.

The organism was not found in several other cases, nor yet in the aqueous vapour condensed in the waiting-room of the Manchester Consumption Hospital.

Physical Society, November 25.—Prof. Clifton, president, in the chair.—A paper by Mr. William Ackroyd, on rainbows produced by light reflected before entering the rain-drops, was read by the Secretary. The author investigated mathematically the rare phenomenon of three bows, and inferred that it would generally take place about sunrise or sunset. Mr. Lecky thought the effect had a simple explanation. It might be said to be due to two suns, one (reflected) appearing to be below the horizon.—Mr. Shellford Bidwell gave an account of some experiments he had made to test the theory of Dr. James Moser, that the action of a selenium cell under light was due to the heat rays making a closer microphonic contact between the selenium and the metal electrode, by expanding the material. He submitted selenium cells to dark heat rays, and found their resistance to *rise*. Under light rays, however, their resistance fell. He therefore concluded that Mr. Moser's theory was erroneous, and that the fall in resistance due to the light rays is the differential result of the rise due to heat and the fall due to light. He also explained the "fatigue" of a selenium cell by use, as caused by its increase of temperature. When the cell cooled again the fatigue disappeared. Dr. Moser and Prof. G. C. Foster made remarks on the paper, the former suggesting experiments to test the reversability of the effects observed by Mr. Bidwell, and the latter seeking to reconcile Mr. Moser's theory with the new data.—Dr. James Moser then read a paper on a general method of strengthening telephonic currents. This consists in forming a primary circuit of the telephone transmitter or derived circuit, a set of induction bobbins in derived circuit, and a changed secondary battery, the whole circuit having a very low resistance. Each primary bobbin has a secondary wound over it, and these secondaries are connected in quantity to the telephone line, which has at its remote end a set of telephones in derived circuit to the earth or return wire. In this way one line wire serves to supply a large number of separate telephones, a hundred being employed by Dr. Moser to transmit music from the Hippodrome in Paris to the Place Vendôme. The system is applicable to long lines; and the induction noises are reduced by subdivision among the separate telephones.

Victoria (Philosophical) Institute, December 4.—A paper by Dr. Miller was read on the references to the Antediluvian period in the cuneiform texts.

Institution of Civil Engineers, November 28.—Sir F. J. Bramwell, vice-president, in the chair.—The paper read was on "American Practice in Warming Buildings by Steam," by the late Mr. Robert Briggs, M. Inst. C.E., of Philadelphia, U.S.

CAMBRIDGE

Philosophical Society, November 27.—On complex multiplication of elliptic functions, by Mr. A. G. Greenhill.—On certain points in the function of the cardiac muscle, by Dr. W. H. Gaskell.—On the development of the Pollinium of Asclepias, by Mr. T. H. Corry.—On some micro-organisms and their relations to disease, by Mr. G. F. Dowdeswell.

BERLIN

Physical Society, November 17.—Prof. Helmholtz in the chair.—Herr Hagen has sought to determine the physical properties, and especially the coefficients of expansion, of metallic sodium and potassium, and he reported on the methods and results of this investigation. Both metals, which, in petroleum, in which they are commonly kept, always present a dull surface of hydrated oxide, Herr Hagen succeeded in keeping, with bright metallic surface, without petroleum, any length of time, in evacuated tubes, after the small amount of oxygen in the residual air had been fixed by a part of the metal in an antechamber. By melting the metal, drops could be formed, from whose heights the capillary constants of the two metals were

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found, viz. 34·23 for sodium, and 14·17 for potassium. The two metals, mixed in the ratio of their equivalents, gave an alloy which is liquid at ordinary temperature, and which, on account of its brilliant metallic surface, might be easily taken for mercury; only its greater specific gravity distinguishes the latter at once from the potassium-sodium alloy. This solidifies at about 4°·5 C., and its capillary constant is 17·86. Very careful experiments were made for determination of the coefficients of expansion, and their relation to the temperature, in suitable dilatometers. The linear expansions, deduced from the volume-expansions, were, for sodium, 0·000853, and for potassium, 0·000721; pretty similar values were had in direct measurement of longitudinal expansion in a metal block. This coefficient of linear expansion exceeds that of all other metals, and is about three times the linear expansion of lead.—Prof. Helmholtz then gave a report of this year's International Congress in Paris, from which he had just returned. The Congress having last year come to an understanding on the units occurring in electrical science and "technic," and their designations, the point now was to determine those units exactly, so that practical normal units might be prepared. Attention was first given to the determination of the unit of resistance,—the "ohm" (as most easily practicable); that is, the exact measurement in metres of the column of pure mercury of one square milimetre cross-section at 0° C., the resistance of which is the "ohm." There were already quite a number of measurements by methods which Herr Helmholtz specified in his lecture. The values obtained are: Herr Kohlrausch, 1·0593; Lord Rayleigh, by the British Association method, 1·0624; Lord Rayleigh, by Lorenz's method, 1·0620; Mr. Glazebrook, in Cambridge, 1·0624; Herr H. Weber, in Brunswick, 1·0611; Herren W. Weber and Zöllner, 1·0552; Mr. Rowland, in America, 1·0572; Herr Dohrn, 1·0546. Against these pretty concordant values, however, stood the mean value obtained by Herr F. Weber, of Zürich, by reliable methods, and from experiments agreeing well together, viz. 1·0471, which came so near the older ohm of the British Association, that the Congress, on the motion of Sir William Thomson, refrained meanwhile from forming a definite conclusion. It was rather agreed to recommend the experimenters (1) to compare their resistances with the standard of resistance which the French Government will produce; (2) to compare the induction coils by the method adopted by Herr Kohlrausch with the wire-circuit; (3) in their measurements to avail themselves of the modified and still further to be improved method of Lorenz. The respective governments should finally be urged to support, as much as possible, the national experiments for determination of the "ohm."

PARIS

Academy of Sciences, November 27.—M. Jamin in the chair.—The following papers were read:—Observations of small planets with the great meridian instrument of Paris Observatory during the third quarter of 1882, by M. Mouchez.—Note on the verification and the use of the magnetic maps of Col. Al. de Tillo, by M. Lalanne. He compares magnetic observations (of declination) made by him in 1837, in four localities of the region north of the Sea of Azof, with Col. de Tillo's two maps (for Russia), and notes some defects of the latter (the longitudes of the two do not refer to the same meridian, &c.).—Reply to the objections of M. Decharme to my rational conception of the nature of electricity; proofs of the validity of hypotheses serving as the basis of this conception, by M. Ledieu.—General law of congelation of solvents, by M. Raoult. Every substance, dissolved in a definite liquid compound capable of solidifying, lowers its freezing-point. In all liquids, the molecular lowerings of congelation with different compounds, approach two values invariable for each liquid, and one of which is double, the other (the greater being normal). The normal lowering varies with the nature of the solvent. A molecule of any compound, dissolving in 100 mol. of any liquid, of different nature, lowers the freezing-point of the latter a quantity nearly constant, and near 0°·62.—Chemical study on maize at different epochs of its vegetation, by M. Leplay. Sugar is found in the leaves, and accumulates in the stem till the moment of formation of starch in the grains. It then migrates into the spike, first into the support of the grains, then into the grains themselves, where it is replaced by starch. This migration continues to be fed by the leaves till they disappear, then in great part by the stem—diminishing, however, as the starch is developed. The function of the sugar, then, is to furnish to the grain the elements of starch.—On the conservation of solar energy; reply to M. Hirn's note, by Dr. C. W. Siemens. He estimates the temperature of the photosphere as 3000°, not too high to satisfy the conditions of combustion (M. Hirn's estimate is 20,000°). The theory of diminution of light intensity as the square of the distance seems to be not applicable to the whole of the light of stars. Some wave-lengths less favourable to decomposition, may on this account reach further. As to mechanical resistance of gaseous matter to the planets, he shows reason for thinking it much less than hitherto supposed.—On a theorem of M. Tisserand, by M. Stieltjes.—Extension of the problem of Remann to hyper-geometric functions of two variables, by M. Goursat.—On a new integrometer, by M. Abdank-Abkanowicz. Increased accuracy is obtained by means of a disc which rolls on a cylinder without slipping.—On a mode of transformation of figures in space, by M. Vaneeck.—Equilibrium of elasticity of a solid limited by a plane, by M. Boussinesq.—Theoretic interpretation of the calming effect produced by a thin layer of oil spread on the surface of the sea, by M. Van der Mensbrugghe.—On electric motors, by M. Deprez. He describes an experiment proving that the two laws—that of independence of the current's mechanical action, of the state of rest or motion of the ring, and that of proportionality of the electromotive forces to the velocities (supposing, of course, the intensity of the current constant)—hold good within very wide practical limits.—General expressions of the absolute temperature, and of Carnot's function, by M. Lippmann.—Range of sounds in air, by M. Allard. Experiments with different instruments yielded the result that the intensity of sound in air decreases much more rapidly than according to the law of the square of the distance. The second cause of enfeeblement is considered to lie in the non-homogeneous character of the air. A given sound may have, apart from the influence of wind, very different ranges, varying, *e.g.* from two to twenty nautical miles. For small augmentations of range the work required increases very rapidly. The differences of range for different pitches within the octave are little sensible.—On the reform of some processes of analysis used in laboratories of agricultural stations and observatories of chemical meteorology (fourth memoir); volumetric determination of alkalino-earthy carbonates in waters, by M. Houzeau.—Modifications of structure of nerve tubes in passing from the spinal roots into the spinal cord, by M. Ranvier.—On the present flood of the Seine, by MM. Lemoine and de Préaudeau.—Magnetic perturbations from November 11 to 21, 1882, by M. Renou.—A letter from M. Tarry on the aurora showed that while the magnetic currents of earth lines render possible a pre-vision of aurora several hours in advance, those on submarine lines give a pre-vision of *several days* in advance.

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